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OCT 30 1963

GROWING
RUSSIAN WILD RYE
in the Western States

CURRENT CONTENTS



Leaflet No. 524

U. S. DEPARTMENT OF AGRICULTURE

GROWING RUSSIAN WILDRYE in the Western States



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Russian wildrye¹ is a long-lived perennial bunchgrass introduced from Siberia. Its primary use is for pasture and range seedings.

The native distribution of the grass is extremely wide. It grows naturally on dry, saline soils of the steppes and steppe slopes from Iran northward to the lower Volga River and lower Don River regions of the Union of Soviet Socialist Republics eastward into western Siberia and across Asia to Outer Mongolia. Crested wheatgrass grows in many of the same regions.

The first recorded introduction of Russian wildrye into the United States was in 1927, when a locally grown variety from the Western Siberian Experiment Station at Omsk was received by the U.S. Department of Agriculture. Seed had been brought into this country earlier, however; a plant specimen was sent to the National Herbarium from the experiment station at Dickinson, N. Dak., in 1913. This

plant came either from seed that was misnamed or in mixture with other seed.

The 1927 introduction was sent to several agricultural experiment stations in the western United States for testing. It was grown under observation at the U.S. Department of Agriculture Northern Great Plains Field Station, Mandan, N. Dak. Small increase plantings were made at that location in 1935. Seed from these plantings was sent to other stations for testing and was used by the U.S. Soil Conservation Service to establish large increase fields. A breeding program was initiated at the Mandan station in 1936 to study breeding behavior and to develop improved strains.

Seed was released for general use in 1941 and 1942 when small lots were sent to farmers in North and South Dakota. As far as is known, all the Russian wildrye growing in the United States with the exception of a few miscellaneous strains in nurseries, originated from the Mandan plantings.

¹ *Elymus junceus* Fisch.

DESCRIPTION AND CHARACTERISTICS

Russian wildrye is a large cross-fertilized bunchgrass, with erect naked stems 2 to 4 feet tall, arising from an abundance of basal leaves. The leaves are lax and strongly nerved; they are 6 to 12 inches long and up to one-fourth inch wide. Plant color varies from dark to light green, with many shades of blue-green.

The head is a dense spike with seed that shatters readily when mature. Short awns and short, stiff hairs on the seed must be removed by some means before the seed will flow evenly through a standard grain drill. Good-quality processed seed weighs 20 to 22 pounds per bushel. There are approximately 175,000 seeds per pound. Germination is rapid and often exceeds 90 percent under the most favorable

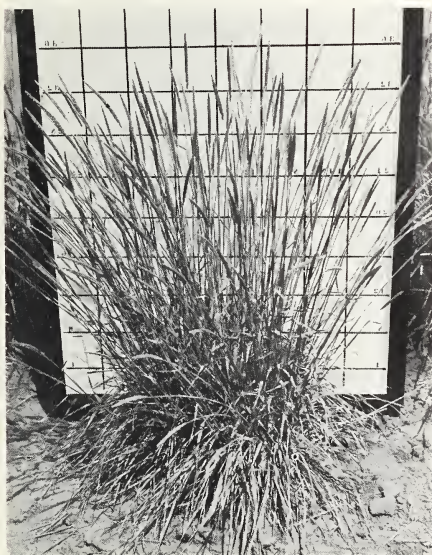
conditions. Seed remains viable about 5 years but it should be planted at least by the third year to obtain good germination and seedling vigor under field conditions.

The grass is exceptionally resistant to cold and drought. It owes its drought resistance to an extensive, fibrous root system that may penetrate the soil to a depth of 8 to 10 feet. Most of the roots occur in the surface foot of soil. In thin stands and spaced rows the roots have a wide horizontal spread and draw heavily on moisture and nutrients for as far as 5 feet. Old stands produce a greater weight of roots per acre than other grasses generally grown in its area of adaptation.

Because of its basal leaf growth, Russian wildrye is generally not a high-yielding hay crop but it has many desirable characteristics that make it valuable for use as pasture. Growth starts early in the season and continues throughout the summer if moisture is available. It makes rapid regrowth when grazed off and responds quickly to summer rains.

Nutritive qualities are excellent throughout the season because of its high digestibility. Protein remains at a higher level from mid-summer to winter than for other grasses grown in its area of adaptation. Livestock gains are generally good even though production based on forage yields may often be relatively low. Palatability, especially for sheep, is higher throughout the season than for most cool-season grasses. In early spring, however, cattle may show greater preference for other grasses if they have a chance for selection.

Owing to excellent curing qualities, Russian wildrye can be grazed



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A typical 3-year-old plant of Russian wildrye grown under dry-land conditions.

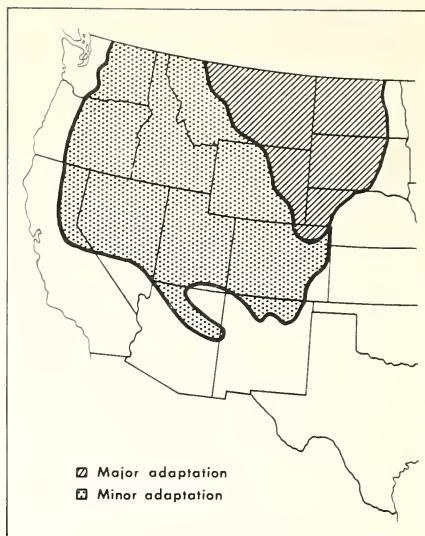
into the fall and early winter. In open winters and in areas of light snow or chinooks, it may furnish considerable winter grazing. During winter the dense plant tufts often have green leaves near the base which increase nutritive quality.

Under unfavorable conditions, Russian wildrye is more difficult to establish than crested wheatgrass and brome. Seedlings lack vigor and are more likely to succumb to excessive planting depth, lack of moisture, blowing soil, crusted soil, insect damage, seedling diseases, and other conditions that restrict growth. Seedbed and seeding requirements therefore are more exacting than for many other grasses. Because of Russian wildrye's bunch-type growth and lack of volutioneering, thin stands normally do not thicken. Since plants are strongly competitive as they become older, the soil around each plant becomes bare and is exposed to erosion. Thin stands may become excessively hummocky with age. Under most conditions it is advisable to reseed thin stands before they become established.

WHERE IT GROWS

The major area of use for Russian wildrye is in the northern Great Plains and adjacent prairie provinces of Canada but its range of adaptation has not been completely determined. Successful plantings have been made in many of the western areas where crested wheatgrass is grown. Failures in establishment are sometimes interpreted as lack of adaptation. Once established, many plantings prove to be remarkably persistent.

It can be grown at elevations of 6,000 to 10,000 feet, but at such ele-



Area of adaptation of Russian wildrye in the United States.

vations other grasses may be more productive. Highly productive stands have been established in the lower Matanuska Valley in Alaska.

Russian wildrye is adapted to a fairly wide range of soil types but appears to do best on fine-textured soils. It requires a relatively fertile soil to be productive. The grass does poorly on soils of low fertility, especially on those that are coarse textured. It is better adapted to soils that tend to be saline or alkaline than is crested wheatgrass.

THE VINALL VARIETY

Vinall Russian wildrye is the only named variety that has been released for general use. This improved variety was developed by the Crops Research Division, Agricultural Research Service, U.S. Department of Agriculture, at the Northern Great Plains Field Station, Mandan, N. Dak. It was released for seed increase in 1960 cooperatively with the Colorado,

Montana, Nebraska, New Mexico, North Dakota, South Dakota, and Wyoming agricultural experiment stations.

The variety is characterized by improved seed yield. At Mandan, N. Dak., the 8-year average for Vinall was 280 pounds of clean seed per acre as compared with 180 pounds for commercial. Vinall has greater lodging resistance than commercial and is comparable or better in seed size, test weight, and forage production.

Vinall is a five-clone synthetic. Foundation seed is available in limited quantities for seed increase. Certified seed is the first generation from foundation seed and is not eligible for further production of certified Vinall.

PASTURE AND RANGE SEEDINGS

Mixtures

Russian wildrye should be seeded alone or in mixture with alfalfa. There is some danger from bloat in grass-alfalfa mixtures, but forage production, livestock gains, and the productive life of the stand may be increased.

Since seedlings of Russian wildrye are slow to develop, more vigorous grasses may tend to dominate the initial stand in mixed grass seedings. Differences in preferences of livestock for various plants in mixed grass seedings also make management of mixtures more difficult than management of pure stands of Russian wildrye.

Preparing the Seedbed

A firm seedbed free from competing plants is essential to the establishment of Russian wildrye.

SOIL PROTECTION

Special care should be taken to protect the land over winter from wind erosion on summer fallow seedings. If there is danger of soil blowing, as much stubble as possible should be left on the soil surface. Small-grain companion crops can be seeded at half the normal rate with the grass to provide protection to the soil and to the young seedlings. If there is a severe blowing hazard, seeding should be delayed until spring.

Well-protected summer fallow, grain stubble, leveled cornland, and well-firmed, plowed land make good seedbeds. Early weeds should be destroyed prior to spring plantings.

To prepare seedbeds on depleted or rough, brush-covered rangeland, use heavy-duty equipment. Your local soil conservation district may have this equipment for rent or loan.

Seeding

Clean, high-quality seed, germinating not less than 85 percent and weighing approximately 20 pounds per bushel, should be used for seeding Russian wildrye.

Time of Seeding.—The most favorable time to seed varies with the locality and the season. With a good moisture supply, either spring or fall seedings should be successful in the Plains area. At high elevations spring seedings should be made.

Early fall seeding on fallow, from August 15 to September 15, is generally best if there are no grasshoppers and if enough soil moisture is available to promote rapid germination. The seedlings will be well started by winter and will be sufficiently developed in the spring to

withstand weed competition and escape seedling blights that often damage spring-planted stands. Plants will also develop much more rapidly during the first growing season.

Late-fall seedings, in October and November, can be made in clean grain or sudangrass stubble. Germination will not take place until the following spring. Spring seedings can be successfully made on cornland, well-packed spring plowing, and protected fallow.

Rate of Seeding.—The rate of seeding should be approximately 6 pounds per acre in the western part of the area of adaptation and 8 pounds in the eastern part. If alfalfa is to be grown with the grass, it should be seeded at 1½ pounds per acre in addition to the grass. When an early fall seeding is made, the alfalfa should not be seeded until spring. Low seeding rates are not advisable with Russian wildrye because it is essential that good initial stands be established. Under most conditions it is advisable to reseed thin stands.

Method of Seeding.—A press drill should be used for seeding because it places the seed in closer contact with moist soil than other types of drills. The drill should be equipped with a seed agitator. If an agitator is not available, someone should ride the drill and keep the seed flowing evenly through the cups.

Broadcasting the seed is usually not a satisfactory method of obtaining stands.

Double-disk press drills can be used on well-packed nontrashy seedbeds. Single-disk and deep-furrow press drills are best for trashy seedbeds. They also leave the soil surface rough and resistant to blowing. For seeding in rough areas, special

range-seeding equipment may be available from State or Federal agencies.

Depth of Seeding.—Seed no deeper than ½ inch on heavy soils or 1 inch on light soils. If possible, depth-control bands should be used on disk-drills. Releasing the spring pressure on the disks may help to avoid planting too deeply.

Drill spacings of 6 to 12 inches are satisfactory for pasture. The wider drill spacings should be used in the western part of the area.

MANAGEMENT

New Stands

Do not graze spring-established stands the first year. If weeds become so heavy that seedling growth is affected, it may be necessary to clip the weeds or spray with 2,4-D. Clip only during cool days and no shorter than 6 inches. Broad-leaved weeds should be sprayed only when there are no alfalfa seedlings. Use ¼ to ¾ pound per acre of 2,4-D after grass seedlings have reached the two- to four-leaf stage. Use the lowest rate required to control the weeds that are a problem. Old weed growth will give excellent cover over winter and catch snow, but should be cut the following spring. Use of a rotary mower is preferable. If a sickle-bar mower is used, the trash should be removed.

Early fall seedings may make enough growth by the middle of the next summer to be grazed. Stands are usually established well enough by the second growing season to keep down weed growth.

Pasture

Since Russian wildrye provides a much longer season of palatable, nutritious forage than most other

seeded pastures, grazing management can be handled in a number of ways:

- Graze at the rate of $\frac{3}{4}$ acre to 1 acre per animal unit for 45 to 75 days in the spring and early summer, then move livestock to native range for the rest of the season. If there is sufficient fall moisture for fall growth, return to Russian wildrye in the fall.

- Rotate livestock from crested wheatgrass in spring to native range in summer to Russian wildrye (not previously grazed) in the fall and early winter.

- Graze season-long at an intensity of approximately 3 times that normally used on native range.

Highest gains per acre will be obtained by grazing Russian wildrye at a heavy intensity for the spring season only, but its use in maintaining gains in the fall is of great value. Gains per head from mid-summer grazing will generally not exceed those on native range.

After the first year it may be necessary to apply nitrogen fertilizer to maintain yields. Response to fertilizer will be greater in the eastern part of the area of adaptation, where moisture conditions are more favorable. Fertilizing is necessary for maintenance of maximum pro-

duction even on fertile soils because of the shortage of available nitrogen that develops as stands become older. Nitrogen should be applied in late fall or early spring at rates of 30 to 40 pounds per acre.

The sod should not be torn up as a method of increasing production of old stands. Thinning the stands may result in severe soil erosion.

SEED PRODUCTION

The Vinall variety was developed for increased seed production. That variety should be used for best results.

Russian wildrye is erratic in seed production. To assure good seed production—

- Grow it on fertile soil.
- Space the rows 3 feet to 7 feet apart—good seed production cannot be expected from solid-drilled seedings.
- Apply nitrogen fertilizer at heavy rates.

Seeding

The same basic principles of seed-bed preparation and time of planting used in seeding pastures apply to seed-production fields. Seed will not be produced the first year from either fall or spring plantings. Good production can be expected the second year.

Approximately 3 to 4 pounds of seed per acre should be used for 3-foot rows. Less seed is required for wider spacings. A regular grain drill, with seed cups plugged to give correct row spacing, can be used. Shoe-type corn planters can also be used if the seed plates are modified to give the correct rate of seeding.

Oats at a rate of not more than 10 pounds per acre can be seeded with the grass to mark the seedling



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An irrigated seed-production plot of Russian wildrye ready for its fourth harvest.

rows for cultivation. Small grains should not be seeded at a full rate with the grass for grain harvest.

Harvesting

Seed shatters rapidly when mature, but harvesting should not start before seed is in the firm dough stage. Harvesting should be completed within a period of 3 or 4 days. A binder is best for harvesting because of less danger from shattering, less danger from heating, and improved seed quality due to more favorable ripening and threshing conditions. The crop can be straight combined but extreme care should be used to avoid heating. The seed can be artificially dried at not more than 90° F. If the crop is swathed, care must be used to avoid dropping the swath between rows or it may be difficult to pick up.

A combine with a rub-bar cylinder is more suitable than one with a tooth cylinder. If a tooth cylinder is used, the clearance between the cylinder and concave should be as wide as possible and the cylinder speed the slowest that will result in complete threshing.

Cleaning

Russian wildrye should be processed to remove the short awns and

hairs on the seed so it can be easily drilled. A good method is to run the seed through a hammer mill at about 1,000 revolutions per minute. The screen should have at least a 1/4-inch opening. Processed seed can easily be cleaned through a standard fanning mill.

Fertilizing and Irrigation

Nitrogen at rates from 50 to 100 pounds per acre, the rate depending on local conditions, must be applied annually to maintain seed production. Phosphorus may also be necessary in some localities. The fertilizer should be applied early in August.

Greatly increased seed production can be obtained from irrigation. For ease of cultivation the row spacing should be at least 3 feet.

Aftermath Management

The heavy growth of basal leaves left after seed is harvested has excellent feed value and should be utilized. It can be grazed, mowed for hay, cut for silage, or used as green-chop. If the aftermath is not utilized for livestock, it should be removed with a rotary mower or in some other manner early in the following spring to avoid a depressing effect on seed yield.

This publication supersedes Leaflet 313, "Russian Wild-Rye."

Washington, D.C.

Issued October 1963

U.S. GOVERNMENT PRINTING OFFICE: 1963 O-690-128

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402 Price 5 cents.

